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Esan volcano is one of active volcanoes in Hokkaido, located at the NE Japan volcanic front, and is composed of a group of lava domes in felsic to intermediate magmas. Each lava dome directly lies on a marine terrace or a Tertiary basement rock without a massive stratocone. The dome migrates in each major eruption. The volcano exposes large number of block-and-ash flow and debris avalanche deposits, but does not expose plinian fall or associated pyroclastic-flow deposits. An average recurrence interval between major dome-building eruptions is a ten thousand year, and the age of last major eruption (MP) is ca. 8,000 yBP. Our recent investigation has revealed four or more eruptive units accompanying with lava dome growth in the last forty thousand years. Well-exposed four units are named as MP, HD1, HD2 and HD3 in descending order. An important finding is that HD1 is dated as ca. 29,000 cal yBP. This age is older than previous ^{14}C age, and thus the recurrence interval between the last (MP) and the 2nd last (HD1) events became ca. 20,000 years.

While the plinian eruption at Esan volcano is unknown, the migration character of dome is the hazardous potential for the nearest social facility where the magma can approach. Our new data for the eruptive age may reduce the hazardous potential than previous alert. Nevertheless, the long-term dormancy over ten thousand years and the lack of plinian eruption suggest the following important questions: (a) The longer storage of viscous magma, though the relatively high magma supply rate expected from upper mantle (no stratocone growth); (b) The smaller amount of dissolved gas, though the longer magma storage (no plinian phase).

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Material Scientific Study on Vulcanian Eruptions of Sakurajima Volcano, Japan

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The present study reports textual parameters of volcanic ash to compare with geophysical parameters observed in vulcanian eruptions of Sakurajima volcano, Japan and gives constraints on factors controlling air shock intensity. Samples are volcanic ash from 17 vulcanian eruptions (1974 to 1987). Using the stereoscopic microscope, we classified volcanic ash particles into two type volcanic glass and free-crystals, and then divided volcanic glass into two sub-classes (smooth surface particles and non-smooth surface particles) from the view point of the surface state of particle. Further, smooth surface particles were classified into N-particle (particles not including vesicles) and V-particle (particles including vesicles) by the polarized microscopic observation. Statistical examination based on classification of volcanic ash shows that 1) for explosions without pre-explosion BL-type earthquake swarms (PBES), the ratio of the number of N-particle to V-particle (N/V number ratio) has positive correlation with air shock intensity, 2) for explosions with PBES, N/V number ratio has negative correlation with air shock intensity and 3) for explosions with PBES, the N/V number ratio has negative correlation with the duration time of PBES. Plagioclase microlite textural analysis was carried out for N-particles with smooth surfaces of five explosions without PBES. The result shows that plagioclase microlite number density (MND) and L/W ratio have the positive correlation with air shock intensity. MND is proportional to the power 3/2 of water exsolution rate from melt. The positive correlation between plagioclase MND and air shock intensity indicate that when water exolution rate (3.8×10^{-5}-1.2×10^{-4} wt.%/s) of magma is high, air shock intensity (54-360Pa: observed at station HAR) by explosion becomes high. On the basis of the textural results, we propose the possible model for magma supply and subsequent pressurization processes in vulcanian eruptions of Sakurajima volcano.

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Experiments on the Gas Dynamics of the Mt. St. Helens 1980 Lateral Blast

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Field evidence suggests that the lateral blast in the 1980 Mt. St. Helens eruption behaved like an underexpanded jet flow. We conduct two experiments to investigate this hypothesis. In our first experiment, we use the compressible flow--shallow-water analogy to measure the geometry of the shock structure around the underexpanded jet, which is comparable with the position of the interface between the direct and channelized blast zones described by Kieffer (1981). Also, Kieffer and Sturtevant (1988) identified furrows created by the blast which were possibly formed by scouring due to Goertler vortices induced by curvature in the terrain. In our second experiment, carried out in a compressible flow laboratory, we investigate an additional Goertler vortex generation mechanism due to the curvature of the shear layer adjacent to the intercepting shocks in the underexpanded jet. These experiments allow for a more-detailed scrutiny of the underexpanded jet--lateral blast analogy proposed by Kieffer (1981).

11-P-150

Formation of Scoria Cone in 1986 Eruption of Izu-Oshima

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Scoria cones have been regarded to be formed by accumulation of ballistic bombs ejected by mild eruptions. However, more recent geological investigations show that some scoria cones could be formed during explosive eruptions. Here, we demonstrate how the scoria cone of the 1986 Izu-Oshima eruption was formed during the explosive eruption. We measured particle fractionation of the cone and propose a theoretical model to explain the observation. The model considers lateral transport of particles by turbulent eddies; particles that reached

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